NIRMA UNIVERSITY
Institute of Technology
Master of Computer Application (2-Years Programme)

MCA Semester-I

L	T	P	C
2	0	2	3

Course Code	**3MCA101**
Course Title	**Object Oriented Programming**

Course Outcomes (COs):

At the end of the course, students will be able to -

1. interpret the basic principles of object oriented programming
2. develop computer programs to solve real world problems using object-oriented principles
3. implement multi-threaded applications with basic input output operations and exception handling

L	T	P	C
3	0	2	4

Course Code	**3MCA102**
Course Title	**Data Structures**

Course Outcomes (COs):

At the end of the course, students will be able to -

1. illustrate the fundamental concepts of data structures
2. analyse various data structures and their applicability
3. comprehend and implement various techniques for searching and sorting
4. identify the appropriate data structures to design efficient algorithm for the given application

L	T	P	C
3	0	2	4

Course Code	**3MCA103**
Course Title	**Operating System**

Course Outcomes (COs):

At the end of the course, students will be able to -

1. illustrate basic components of operating systems
2. comprehend the mechanism of operating Systems to handle processes, memory and file management
3. demonstrate competence in recognizing and using operating system features
4. understand the mechanism of Operating systems to handle Input Output management

L	T	P	C
3	0	2	4

Course Code	3MCA104
Course Title	Database Management System

Course Outcomes (COs):

At the end of the course, students will be able to -

1. describe fundamental elements and various models of database system
2. devise E-R models to represents simple database application scenario
3. apply relational database concepts to design and create databases
4. implement queries and procedures to use database system effectively along with transaction management

L	T	P	C
3	0	2	4

Course Code	3MCA105
Course Title	Computer Networks

Course Outcomes (COs):

At the end of the course, students will be able to -

1. describe concepts of computer networks with related applications
2. comprehend layered architecture of computer network and functions of different layers
3. understand and building the skills of subnetting and routing mechanisms
4. use network simulating tools for simulating network protocols

L	T	P	C
0	0	4	2

Course Code	3MCA106
Course Title	Web Technology

Course Outcomes (COs):

At the end of the course, students will be able to -

1. apply the knowledge of HTML to structure web pages and applications.
2. use CSS to styling and visually format web pages and applications.
3. apply the knowledge of JavaScript Programming for interactive front-end web development.
4. develop mobile and browser responsive web application.

L	T	P	C
1	0	0	0

Course Code	**3MCASP01**
Course Title	**Capstone Course**

Course Learning Outcomes (CLO):

At the end of the course, students will be able to -

1. use basic components and capabilities of the computing system and design digital circuits
2. identify problems , develop flowcharts, pseudo code and program to solve them
3. apply mathematical constructs in formal representation of various computing problems

MCA Semester-II

L	T	P	C
3	0	2	4

Course Code	3MCA201
Course Title	Design and Analysis of Algorithms

Course Outcomes:

At the end of the course, students will be able to -

1. identify the appropriate data structure to design an efficient algorithm for the given problem
2. implement various techniques for searching and sorting
3. apply appropriate algorithmic technique to solve a given problem
4. analyze performance of algorithms and estimate their worst-case and average-case behavior

L	T	P	C
3	0	2	4

Course Code	3MCA202
Course Name	Software Engineering

Course Outcomes:

At the end of the course, students will be able to –

1. explain various phases of software development lifecycle
2. analyze and document the requirement specifications for a software project
3. develop the process model using standard tools and methodologies
4. implement a quality software project through effective team-building, planning, scheduling and risk assessment

L	T	P	C
2	0	2	3

Course Code	3MCA203
Course Name	Internet of Things

Course Outcomes:

At the end of the course, students will be able to

1. comprehend the architectural components and platforms of IoT ecosystem
2. apply appropriate access technology and protocol as per the application requirement
3. develop applications on IoT platform

L	T	P	C
0	0	4	2

Course Code	**3MCA204**
Course Title	**Python Programming**

Course Outcomes:

At the end of the course, students will be able to -

1. identify suitable libraries of python to apply for various computational problems
2. design and develop applications using various object oriented concepts of python
3. apply modern tools for designing and developing GUI applications
4. apply the knowledge of python in applications related to data science and data visualization

L	T	P	C
2	0	0	2

Course Code	3MCA205
Course Title	Probability and Statistics

Course Outcomes:

At the end of the course, students will be able to -

1. comprehend prerequisite knowledge to apply the concepts of probability in simulation and modeling of various computer science problems
2. apply statistical methods in various computer science related projects and research
3. simulate the concepts of statistics for real world problems

Department Elective-I

L	T	P	C
3	0	2	4

Course Code	3MCAD251
Course Title	Advance Java Technology

Course Outcomes:

At the end of the course, students will be able to -

1. describe and interpret the basics of Java technologies
2. design and develop the web applications
3. access data from relational databases through a Java application
4. apply modern tools and frameworks for designing and developing web applications and web services.

L	T	P	C
3	0	2	4

Course Code	3MCAD252
Course Name	Open Source Technology

Course Outcomes:

At the end of the course, students will be able to –

1. describe and interpret the basics of PHP technologies.
2. design and develop the web applications using databases
3. access data from relational databases through a PHP application
4. apply modern tools and frameworks for designing and developing web applications and web services.

L	T	P	C
3	0	2	4

Course Code	3MCAD253
Course Name	Micro service Architecture and Programming

Course Learning Outcomes (CLO):

At the end of the course, students will be able to –

1. recognize the key advantages and complexities present in micro service architectures
2. apply appropriate architectural approach for the design of micro services
3. implement micro service applications effectively with the suitable techniques and technologies
4. implement data streaming approaches using suitable tools and technologies

MCA Semester-III

NIRMA UNIVERSITY

Institute:	Institute of Technology
Name of Programme:	Master of Computer Application (2-Years Programme)
Course Code:	3MCA301
Course Title:	Machine Learning
Course Type:	Core
Year of Introduction:	2021-22

Credit Scheme

L	**T**	**Practical Component**				**C**
		LPW	**PW**	**W**	**S**	
3	0	2	-	-	-	4

Course Learning Outcomes (CLO):

At the end of the course, students will be able to –

1. extend the statistical methods as a basis of machine learning domain
2. apply variety of learning algorithms for appropriate applications
3. implement machine learning techniques to solve problems in applicable domains
4. evaluate performance of a variety of learning algorithms to solve problems in applicable domains.
5.

NIRMA UNIVERSITY

Institute:	Institute of Technology
Name of Programme:	Master of Computer Application (2-Years Programme)
Course Code:	3MCA302
Course Title:	Mobile Application Development Technologies
Course Type:	Core
Year of Introduction:	2021-22

Credit Scheme

L	**T**	**Practical Component**				**C**
		LPW	**PW**	**W**	**S**	
0	0	4	-	-	-	2

Course Learning Outcomes (CLO):

At the end of the course, students will be able to –

1. apply the concepts of mobile technologies in developing various applications
2. utilize various tools and technologies to create mobile applications
3. design the data centric applications for mobile devices
4. develop multi-platform applications for mobile devices

NIRMA UNIVERSITY

Institute:	Institute of Technology
Name of Programme:	Master of Computer Application (2-Years Programme)
Course Code:	3MCA303

Course Title:	Cloud Computing
Course Type:	Core
Year of Introduction:	2021-22

Credit Scheme

L	T	Practical Component				C
		LPW	PW	W	S	
3	0	2	-	-	-	4

Course Learning Outcomes (CLO):
At the end of the course, students will be able to –

1. interpret the issues related to cloud computing and its applications
2. identify various cloud service delivery models and platforms
3. build cloud services and applications
4. apply security aspects and configure the cloud

.

NIRMA UNIVERSITY

Institute:	Institute of Technology
Name of Programme:	Master of Computer Application (2-Years Programme)
Course Code:	3MCAD351
Course Title:	Big Data Analytics
Course Type:	Departmental Elective
Year of Introduction:	2021-22

Credit Scheme

L	T	Practical Component				C
		LPW	PW	W	S	
3	0	2	-	-	-	4

Course Learning Outcomes (CLO):
At the end of the course, students will be able to –

1. explain the significance and challenges of Big Data
2. interpret Big Data using different tools and frameworks
3. utilize Distributed File System with MapReduce programming
4. apply Big Data techniques for useful business applications

NIRMA UNIVERSITY

Institute:	Institute of Technology
Name of Programme:	Master of Computer Application (2-Years Programme)
Course Code:	3MCAD352
Course Title:	Data Encryption
Course Type:	Departmental Elective
Year of Introduction:	2021-22

Credit Scheme

L	T	Practical Component				C
		LPW	PW	W	S	
3	0	2	-	-	-	4

Course Learning Outcomes (CLO):
At the end of the course, students will be able to –

1. identify the role of symmetric and asymmetric cryptographic techniques
2. relate the mathematical foundations with the modern cryptographic techniques
3. apply the concepts of pseudorandom number generation for various cryptographic activities
4. examine modern cryptographic techniques such as digital signatures and hashing

NIRMA UNIVERSITY

Institute:	Institute of Technology
Name of Programme:	Master of Computer Application (2-Years Programme)
Course Code:	3MCAD353
Course Title:	UI / UX Design
Course Type:	Departmental Elective
Year of Introduction:	2021-22

Credit Scheme

L	T	Practical Component				C
		LPW	PW	W	S	
3	0	2	-	-	-	4

Course Learning Outcomes (CLO):
At the end of the course, students will be able to –

1. summarize asynchronous code using node.js for developing web applications
2. build MEAN stack web application with Node.js, Express.JS and AngularJs
3. apply concepts of full stack development with modern frameworks
4. develop user interface for applications using specific methods in user experience design

NIRMA UNIVERSITY

Institute:	Institute of Technology
Name of Programme:	Master of Computer Application (2-Years Programme)
Course Code:	3MCAD354
Course Title:	Human Computer Interface
Course Type:	Departmental Elective
Year of Introduction:	2021-22

Credit Scheme

L	T	Practical Component				C
		LPW	PW	W	S	
3	0	2	-	-	-	4

Course Learning Outcomes (CLO):
At the end of the course, students will be able to –

1. evaluate user interfaces to detect usability problems
2. apply an appropriate interaction style for a given need
3. implement the HCI techniques to build multimodal GUI
4. build the applications having sensory signal driven UI

NIRMA UNIVERSITY

Institute:	Institute of Technology
Name of Programme:	Master of Computer Application (2-Years Programme)
Course Code:	3MCAD355
Course Title:	System Software
Course Type:	Departmental Elective
Year of Introduction:	2021-22

Credit Scheme

L	T	Practical Component				C
		LPW	PW	W	S	
3	0	2	-	-	-	4

Course Learning Outcomes (CLO):
At the end of the course, students will be able to –

1. relate formal grammar with the concepts of language processing
2. illustrate functionalities of various system software like loader, linker, and device driver
3. analyze working of assembler and macro-preprocessor
4. design a simple compiler using code optimization techniques

NIRMA UNIVERSITY

Institute:	Institute of Technology
Name of Programme:	Master of Computer Application (2-Years Programme)
Course Code:	3MCAD356
Course Title:	Blockchain Foundations
Course Type:	Departmental Elective
Year of Introduction:	2021-22

Credit Scheme

L	T	Practical Component	C

		LPW	PW	W	S	
3	0	2	-	-	-	4

Course Learning Outcomes (CLO):
At the end of the course, students will be able to –

1. define the structure of Blockchain networks
2. apply various models of permissioned Blockchain
3. design the applications based on Blockchain technology
4. evaluate security issues relating to Blockchain and cryptocurrency

NIRMA UNIVERSITY

Institute:	Institute of Technology
Name of Programme:	Master of Computer Application (2-Years Programme)
Course Code:	3MCAD357
Course Title:	Database Administration
Course Type:	Departmental Elective
Year of Introduction:	2021-22

Credit Scheme

L	T	Practical Component				C
		LPW	PW	W	S	
3	0	2	-	-	-	4

Course Learning Outcomes (CLO):
At the end of the course, students will be able to –

1. perform the roles of database administrator and configure the database system
2. manage database instances and transactions
3. implement performance and tuning techniques for enhancing database performance
4. apply security, backup and recovery policies
5.

NIRMA UNIVERSITY

Institute:	Institute of Technology
Name of Programme:	Master of Computer Application (2-Years Programme)
Course Code:	3MCAD358
Course Title:	High Performance Computing
Course Type:	Departmental Elective
Year of Introduction:	2021-22

Credit Scheme

L	T	Practical Component	C

		LPW	PW	W	S	
3	0	2	-	-	-	4

Course Learning Outcomes (CLO):
At the end of the course, students will be able to –

1. summarize various optimization techniques for serial code
2. apply distributed parallel programming concepts to develop applications
3. analyze the functionality of modern processor
4. design applications using the concepts of parallel computing paradigm

NIRMA UNIVERSITY

Institute:	Institute of Technology
Name of Programme:	Master of Computer Application (2-Years Programme)
Course Code:	3MCAD359
Course Title:	Information Retrieval
Course Type:	Departmental Elective
Year of Introduction:	2021-22

Credit Scheme

L	T	Practical Component				C
		LPW	PW	W	S	
3	0	2	-	-	-	4

Course Learning Outcomes (CLO):
At the end of the course, students will be able to –

1. summarize the concepts, algorithms, data/file structures necessary to design, and implement IR systems
2. apply methodology for the design and evaluation of IR systems
3. compare major types of IR systems, the different theoretical foundations underlying these systems
4. develop the practical skills for IR systems design

NIRMA UNIVERSITY

Institute:	Institute of Technology
Name of Programme:	Master of Computer Application (2-Years Programme)
Course Code:	3MCAD360
Course Title:	Data Mining and Visualization
Course Type:	Departmental Elective
Year of Introduction:	2021-22

Credit Scheme

L	T	Practical Component				C
		LPW	PW	W	S	

3	0	2	-	-	-	4

Course Learning Outcomes (CLO):
At the end of the course, students will be able to –

1. summarize the process of associations, classification and regression
2. analyse the process of wrangling, exploring and analysing data
3. apply visualization techniques for visualizing streaming data of various domains
4. evaluate visualization tools to do data analysis.

NIRMA UNIVERSITY

Institute:	Institute of Technology
Name of Programme:	Master of Computer Application (2-Years Programme)
Course Code:	3MCAD361
Course Title:	Cyber Security and Cyber Laws
Course Type:	Departmental Elective
Year of Introduction:	2021-22

Credit Scheme

L	**T**	**Practical Component**				**C**
		LPW	**PW**	**W**	**S**	
3	0	2	-	-	-	4

Course Learning Outcomes (CLO):
At the end of the course, students will be able to –

1. understand the need for computer security
2. analyze the vulnerabilities in the computer system
3. design system to handle simple cyber attacks
4. understand the legal aspects to handle cyber-crimes and cyber frauds

NIRMA UNIVERSITY

Institute:	Institute of Technology
Name of Programme:	Master of Computer Application (2-Years Programme)
Course Code:	3MCAD362
Course Title:	Agile Software Development
Course Type:	Departmental Elective
Year of Introduction:	2021-22

Credit Scheme

L	**T**	**Practical Component**				**C**
		LPW	**PW**	**W**	**S**	
3	0	2	-	-	-	4

Course Learning Outcomes (CLO):
At the end of the course, students will be able to –

1. summarize the Agile design, development practices and recent trends in Industry
2. apply design principles and refactoring to achieve Agility
3. analyse Agile project management practices
4. test the application for unit tests using Test Driven Development

NIRMA UNIVERSITY

Institute:	Institute of Technology
Name of Programme:	Master of Computer Application (2-Years Programme)
Course Code:	3MCAD363
Course Title:	Artificial Intelligence
Course Type:	Departmental Elective
Year of Introduction:	2021-22

Credit Scheme

L	**T**	**Practical Component**				**C**
		LPW	**PW**	**W**	**S**	
3	0	2	-	-	-	4

Course Learning Outcomes (CLO):
At the end of the course, students will be able to –

1. identify the major areas and challenges of artificial intelligence
2. analyze the applicability of various search algorithms to solve problems
3. apply various knowledge representation and reasoning techniques to model the problems of artificial domain
4. develop an expert system for a specific application domain

NIRMA UNIVERSITY

Institute:	Institute of Technology
Name of Programme:	Master of Computer Application (2-Years Programme)
Course Code:	3MCAD364
Course Title:	Augmented and Virtual Reality
Course Type:	Departmental Elective
Year of Introduction:	2021-22

Credit Scheme

L	**T**	**Practical Component**				**C**
		LPW	**PW**	**W**	**S**	
3	0	2	-	-	-	4

Course Learning Outcomes (CLO):
At the end of the course, students will be able to –

1. understand the differences in AR/VR concepts and technologies
2. evaluate usability of AR/VR applications and critique their use of AR/VR capabilities
3. design AR/VR applications using state-of-the-art tools
4. apply the AR/VR development approaches to build AR/VR applications

NIRMA UNIVERSITY

Institute:	Institute of Technology
Name of Programme:	Master of Computer Application (2-Years Programme)
Course Code:	3MCAD365
Course Title:	Geographic Information System
Course Type:	Departmental Elective
Year of Introduction:	2021-22

Credit Scheme

L	**T**	**Practical Component**				**C**
		LPW	**PW**	**W**	**S**	
3	0	2	-	-	-	4

Course Learning Outcomes (CLO):
At the end of the course, students will be able to –

1. summarize the concepts and practices of Geographic Information Systems (GIS)
2. interpret the types of data models, data input, topology, data management functions and data output
3. analyze spatial data, using GIS analysis tools
4. apply GIS analysis to address geospatial problems and/or research questions.

NIRMA UNIVERSITY

Institute:	Institute of Technology
Name of Programme:	Master of Computer Application (2-Years Programme)
Course Code:	3MCAD366
Course Title:	Mobile Operating System
Course Type:	Departmental Elective
Year of Introduction:	2021-22

Credit Scheme

L	**T**	**Practical Component**				**C**
		LPW	**PW**	**W**	**S**	
3	0	2	-	-	-	4

Course Learning Outcomes (CLO):
At the end of the course, students will be able to –

1. compare the similarities, differences and benefits of the current mobile operating systems
2. demonstrate the native applications required to build using mobile OS
3. explain the functionalities of remote operations and security essential of mobile devices
4. analyze the latest trends in building Mobile OS

NIRMA UNIVERSITY

Institute:	Institute of Technology
Name of Programme:	Master of Computer Application (2-Years Programme)
Course Code:	3MCAD367
Course Title:	Dynamic Web Management
Course Type:	Departmental Elective
Year of Introduction:	2021-22

Credit Scheme

L	**T**	**Practical Component**				**C**
		LPW	**PW**	**W**	**S**	
3	0	2	-	-	-	4

Course Learning Outcomes (CLO):
At the end of the course, students will be able to –

1. demonstrate server installation and configuration process
2. identify various issues relevant to web server administration
3. analyze and extend the web server capabilities
4. build cloud migration strategy

NIRMA UNIVERSITY

Institute:	Institute of Technology
Name of Programme:	Master of Computer Application (2-Years Programme)
Course Code:	3MCAD368
Course Title:	Network Administration
Course Type:	Departmental Elective
Year of Introduction:	2021-22

Credit Scheme

L	**T**	**Practical Component**				**C**
		LPW	**PW**	**W**	**S**	
3	0	2	-	-	-	4

Course Learning Outcomes (CLO):
At the end of the course, students will be able to –

1. interpret the functions of various LAN components and devices
2. configure and manage the domain server, users and routers for various networks
3. illustrate, configure and manage secure wired and wireless computer networks and network servers
4. analyze the working and performance of computer networks using various network monitoring tools

NIRMA UNIVERSITY

Institute:	Institute of Technology
Name of Programme:	Master of Computer Application (2-Years Programme)
Course Code:	3MCAD369
Course Title:	Robotics
Course Type:	Departmental Elective
Year of Introduction:	2021-22

Credit Scheme

L	**T**	**Practical Component**				**C**
		LPW	**PW**	**W**	**S**	
3	0	2	-	-	-	4

Course Learning Outcomes (CLO):
At the end of the course, students will be able to –

1. interpret mathematical concepts to model robot manipulators and mobile robots
2. deduce trade-off between different sensors, actuators and their processing algorithms
3. relate the computational challenges inherent in fundamental mobile robotic tasks
4. create the robotic environment with appropriate algorithms

NIRMA UNIVERSITY

Institute:	Institute of Technology
Name of Programme:	Master of Computer Application (2-Years Programme)
Course Code:	3MCAD301
Course Title:	Operations Research
Course Type:	Departmental Elective
Year of Introduction:	2021-22

Credit Scheme

L	**T**	**Practical Component**				**C**
		LPW	**PW**	**W**	**S**	
3	0	0	-	-	-	3

Course Learning Outcomes (CLO):
At the end of the course, students will be able to –

1. illustrate the importance of optimization in industrial process management
2. apply concepts and methods in optimization theory to formulate and solve different optimization problem
3. analyse and appreciate variety of performance measures for various optimization problems
4. apply the optimal solutions of different operation research concepts to solve networks and graph problems

NIRMA UNIVERSITY

Institute:	Institute of Technology
Name of Programme:	Master of Computer Application (2-Years Programme)
Course Code:	3MCAD302
Course Title:	Managerial Economics and Financial Management
Course Type:	Departmental Elective
Year of Introduction:	2021-22

Credit Scheme

L	**T**	**Practical Component**				**C**
		LPW	**PW**	**W**	**S**	
3	0	0	-	-	-	3

Course Learning Outcomes (CLO):
At the end of the course, students will be able to –

1. define the role of accounting in business and society
2. interpret different principles and concepts of managerial economics and financial accounting
3. build and analyze financial statements
4. estimate demand and supply using various methods and assess cost determinants

NIRMA UNIVERSITY

Institute:	Institute of Technology
Name of Programme:	Master of Computer Application (2-Years Programme)
Course Code:	3MCAD303
Course Title:	Secured Software Engineering
Course Type:	Departmental Elective
Year of Introduction:	2021-22

Credit Scheme

L	**T**	**Practical Component**				**C**
		LPW	**PW**	**W**	**S**	
3	0	0	-	-	-	3

Course Learning Outcomes (CLO):
At the end of the course, students will be able to –

1. summarize the fundamentals of secure software and software vulnerabilities
2. apply practices and principles of secure software development for real-world problems
3. analyse requirement engineering phases for secure software development
4. develop and test the application from security aspect

NIRMA UNIVERSITY

Institute:	Institute of Technology
Name of Programme:	Master of Computer Application (2-Years Programme)
Course Code:	3MCAD304
Course Title:	Enterprise Resource Planning
Course Type:	Departmental Elective
Year of Introduction:	2021-22

Credit Scheme

L	**T**	**Practical Component**				**C**
		LPW	**PW**	**W**	**S**	
3	0	0	-	-	-	3

Course Learning Outcomes (CLO):
At the end of the course, students will be able to –

1. explain various fundamentals and modules of Enterprise Resource Planning (ERP)
2. apply CRM concept and implementation of various ERP packages
3. analyze and compare various decision-making processes using ERP
4. evaluate ERP life cycle, E-Business, E-Commerce, SCM, CRM

NIRMA UNIVERSITY

Institute:	Institute of Technology
Name of Programme:	Master of Computer Application (2-Years Programme)
Course Code:	3MCAD306
Course Title:	Business Data Analytics
Course Type:	Departmental Elective
Year of Introduction:	2021-22

Credit Scheme

L	**T**	**Practical Component**				**C**
		LPW	**PW**	**W**	**S**	
3	0	0	-	-	-	3

Course Learning Outcomes (CLO):
At the end of the course, students will be able to –

1. explain how business analytics is used to formulate and solve business problems
2. apply the processes needed to develop, report, and analyse business data
3. identify and use various business analytics, integration, and reporting software
4. analyze data modelling and related tools

NIRMA UNIVERSITY

Institute:	Institute of Technology
Name of Programme:	Master of Computer Application (2-Years Programme)
Course Code:	3MCAD307
Course Title:	Video Processing
Course Type:	Departmental Elective
Year of Introduction:	2021-22

Credit Scheme

L	**T**	**Practical Component**				**C**
		LPW	**PW**	**W**	**S**	
3	0	0	-	-	-	3

Course Learning Outcomes (CLO):
At the end of the course, students will be able to –

1. interpret videos as three-dimensional signal in the spatio-temporal domain
2. explain video quality enhancement techniques and methods
3. analyze various video compression techniques and their applicability
4. design video processing system and compare video processing tool

NIRMA UNIVERSITY

Institute:	Institute of Technology
Name of Programme:	Master of Computer Application (2-Years Programme)
Course Code:	3MCAD308
Course Title:	Compiler Construction
Course Type:	Departmental Elective
Year of Introduction:	2021-22

Credit Scheme

L	**T**	**Practical Component**				**C**
		LPW	**PW**	**W**	**S**	
3	0	0	-	-	-	3

Course Learning Outcomes (CLO):
At the end of the course, students will be able to –

1. summarize the functionalities of various phases of compiler
2. apply language theory concepts to various phases of compiler design
3. identify appropriate optimization technique for compilation process
4. design a miniature compiler using appropriate compiler design concepts

NIRMA UNIVERSITY

Institute:	Institute of Technology
Name of Programme:	Master of Computer Application (2-Years Programme)
Course Code:	3MCAD309
Course Title:	Software Testing and Validation
Course Type:	Departmental Elective
Year of Introduction:	2021-22

Credit Scheme

L	**T**	**Practical Component**				**C**
		LPW	**PW**	**W**	**S**	
3	0	0	-	-	-	3

Course Learning Outcomes (CLO):
At the end of the course, students will be able to –

1. define complete software testing life cycle
2. demonstrate understanding of test management process
3. identify the need of automation testing
4. interpret the basic principles of software verification and validation

NIRMA UNIVERSITY

Institute:	Institute of Technology
Name of Programme:	Master of Computer Application (2-Years Programme)
Course Code:	3MCAD310
Course Title:	Deep Learning
Course Type:	Departmental Elective
Year of Introduction:	2021-22

Credit Scheme

L	**T**	**Practical Component**				**C**
		LPW	**PW**	**W**	**S**	
3	0	0	-	-	-	3

Course Learning Outcomes (CLO):
At the end of the course, students will be able to –

1. explain the need of deep learning approaches over machine learning

2. model the appropriate deep learning algorithm for a specific problem
3. apply deep learning algorithms for solving real-world problems
4. evaluate the deep learning algorithms for different types of learning tasks in various domains

Institute:	Institute of Technology
Name of Programme:	Master of Computer Application (2-Years Programme)
Course Code:	3MCASP03
Course Title:	Summer Internship
Course Type:	Supplementary
Year of Introduction:	2021-22

Credit Scheme

L	**T**	**Practical Component**				**C**
		LPW	**PW**	**W**	**S**	
0	0	0	-	-	-	-

Course Learning Outcomes (CLO):

After successful completion of the course, student will be able to –

1. perceive a better understanding of the technology workplace
2. adapt competencies necessary for professional career,
3. value interpersonal and human relationship skills,
4. build the foundation for major project.

MCA Semester-IV

NIRMA UNIVERSITY

Institute:	Institute of Technology
Name of Programme:	Master of Computer Application (2-Years Programme)
Course Code:	3MCA401
Course Title:	Internship
Course Type:	Core
Year of Introduction:	2021-22

Credit Scheme

L	**T**	**Practical Component**				**C**
		LPW	**PW**	**W**	**S**	
0	0	0	-	-	-	20

Course Learning Outcomes (CLO):

After successful completion of the course, student will be able to –

5. support the theoretical learning with practice and integrate knowledge for engineering applications,
6. adapt to real time industry exposure and experience,
7. develop work habits, interpersonal skills and attitudes necessary for professional success,
8. evaluate the interests and abilities in the field of study,
9. appraise the importance of an individual and multidisciplinary team for effective execution,
10. build the career alternatives prior to graduation,
11. value the health, environment, safety and ethical practices during the internship,
12. compile and conclude the learning during internship with effective communication amongst peers, mentors and society,
13. develop lifelong learning skills for productive career / entrepreneurship.